

Heavy-Duty Diesel Engine Software Upgrade Regulation (Chip Reflash)

**Board Hearing
Sacramento, California
March 25, 2004**



California Environmental Protection Agency

Air Resources Board

Overview

- Background
- Proposed Heavy-Duty Diesel Engine Software Upgrade Regulation
- Proposed Voluntary Chip Reflash Program
- Recommendation

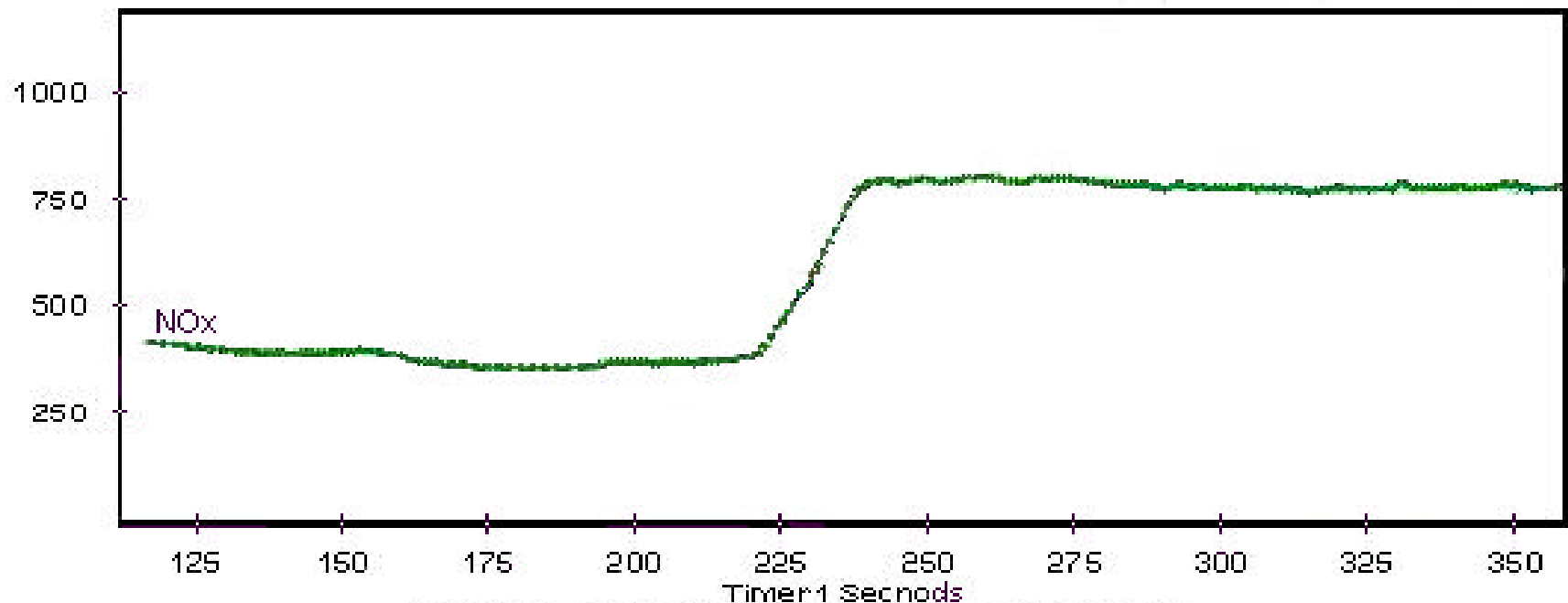
Background

Software Programs on Computer-Controlled Engines

- Electronically-controlled engines introduced in the early 1990s
- Manufacturers used different engine software programming in-use than on the test cycle
- Caused high NO_x emissions: in-use emissions at times 2 - 3 times certification levels
- “Off-cycle” NO_x varies by manufacturer

The Problem: Off-Cycle NOx Emissions

PPM vs. Time



Consent Decrees/Settlement Agreements

Mfrs: Caterpillar, Cummins, DDC, Mack/Volvo, Renault, International (Navistar)

Govt: Dept. of Justice, U.S. EPA, ARB

- Agreements announced October 1998
- Manufacturers required to partially mitigate high NOx emissions

Low NOx Rebuild Program

- Engine manufacturers required to develop low NOx software and reprogram engines at time of rebuild
- . . . or upon request
- U.S. EPA/ARB estimated emission benefits based on 300,000 to 350,000 mile rebuild
- Engines lasting much longer before rebuild: 750,000 to 1 million miles
- Low NOx software installed on less than 10% of eligible engines

Proposed Heavy-Duty Diesel Engine Software Upgrade Regulation

Applicability

- 1993 - 1999 MY heavy-duty diesel trucks, school buses, and motor homes
- Engines for which low NOx software is available
- Includes out-of-state vehicles that visit California

Implementation Schedule

- 1993 - 1994 MY By ~~04/30/04~~ **4/30/05**
- 1995 - 1996 MY By ~~08/31/04~~ **8/31/05**
- 1997 - 1998 MY By ~~12/31/04~~ **12/31/05**
- 1997 - 1998 MY Medium Heavy-Duty by 12/31/06

Benefits of Proposed Regulation with Delay

- Reduces NOx emissions
 - 13 tpd reduction from California vehicles by 2006
 - 32 tpd reduction from California vehicles by 2007
 - 21 tpd reduction from California vehicles by 2010
- Helps meet SIP commitments
- Improves air quality and provides associated health benefits

Regulation Summary

- Software available now at authorized dealers/distributors
- Installation is quick: 15-30 minutes
- Reduces NOx emissions by about 25% per vehicle
- Enforcement through Smoke Inspection Program

Issues

- Who Pays for Reflashes?
 - ARB argues manufacturers, upon request
 - Engine Manufacturers argue only on rebuild
- Resolution only through courts certain
 - Likely to delay reflashes under regulation for approx. 2 years
- Engine manufacturers have agreed to pay for reflashes
 - Non-regulatory, voluntary program

Proposed Voluntary Chip Reflash Program

Voluntary Program Elements

- Engine manufacturers agree to support and pay for reflashes on CA-registered vehicles
- Reflashes at any service event or upon request
- ARB maintains regulatory program as a backstop
- Regulation will be filed if sufficient progress not made by November or progress does not appear sustainable

Reflash Targets

- 35 percent by November 2004
- 60 percent by June 2005
- 80 percent by February 2006
- 100 percent by 2010

Of California-registered vehicles reflashable
emission reductions

How Would Regulation Be Used As a Backstop?

- Staff asks the Board to adopt the proposed Chip Reflash regulation
- Board adopts and directs the Executive Officer to withhold filing with the Office of Administrative Law (OAL)
- Staff prepares all paperwork to file the regulation with OAL
- Meanwhile, voluntary program is in effect

How Would Regulation Be Used As a Backstop? (con't)

- Board evaluates the voluntary program results at Board meeting in December 2004
- if the Board determines that the voluntary program is successful then voluntary program continues
- if the Board determines that the voluntary program is NOT successful then staff files regulation with OAL

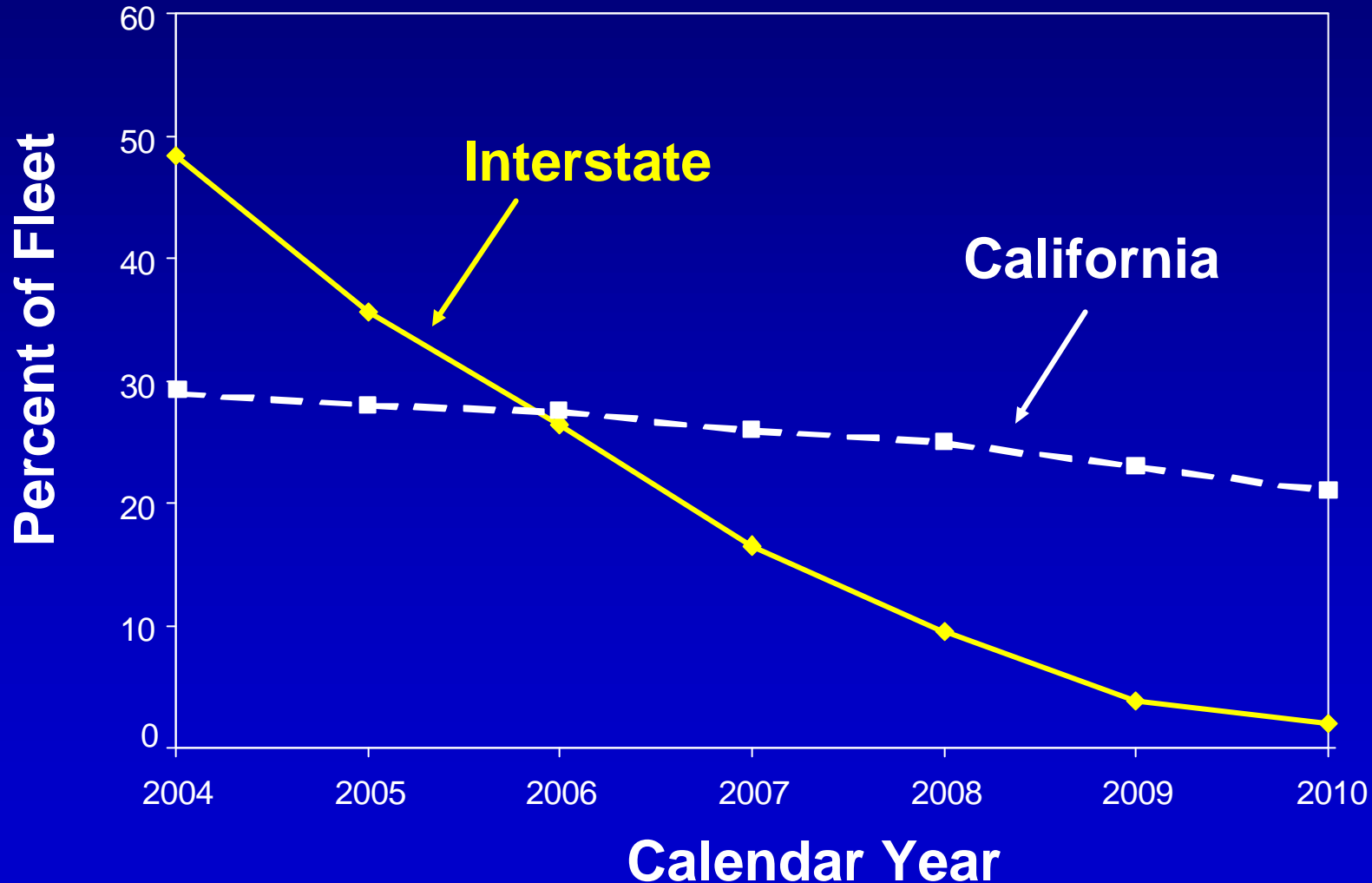
Number of Vehicles

- 42,000 CA reflashable Heavy HD engines
 - Provides 99% of voluntary program benefit
- 8-15,000 medium HD engines
- Larger number of out-of-state registered trucks
 - Infrequent operation in CA
 - In-CA use drops as vehicles age
 - 6-9 tpd potential NOx reduction in 2006
 - Drops to 1.6 tpd in 2008

Out-of-State Vehicles - Voluntary Agreement

- Engine manufacturers will not pay for reflashes upon request
- No credit for reflashing out-of-state trucks until after 60% target met
 - Credit only 3% of a CA-registered truck
- By 2010 nearly all out-of-state trucks in local service outside of CA or reflashed on rebuild

Projected Percent of 1993-1998 MY Fleet

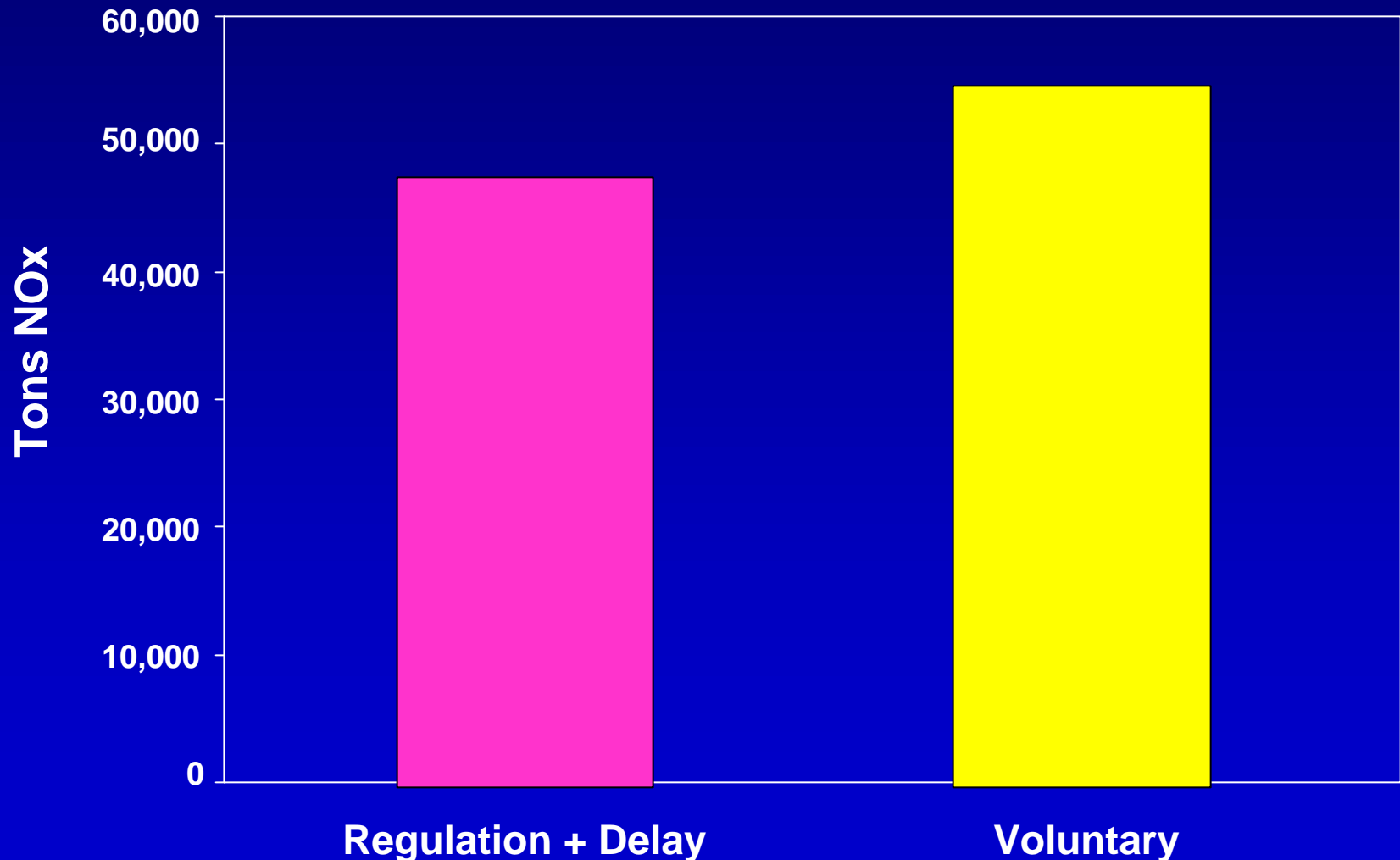


Statewide Benefits of Software Upgrade (tons per day NOx)

Ozone Season	Regulation with delay	Voluntary Program
2004	3	11
2005	3	21
2006	13	26
2008	27	23
2010	21	21

Emissions Reduced 2004-2010

Voluntary Program vs. Regulation + Delay



Voluntary Program Summary

- Gets reflashes started now!
- Removes uncertainty of “who pays” and legal challenges that would delay reflashes
- “No regrets” approach
 - Reductions achieved in 2004 even if voluntary program fails December review
 - Backstop regulation can be in place in early 2005 if needed
- Cooperation with all parties increases chances of success

Outreach to Vehicle Owners

- Staff plans to notify affected vehicle owners of the outcome of this Board meeting
 - Regulation or Voluntary Program
 - Mail notification to California-registered vehicle owners
 - Post notice on website
- CTA Outreach Events

Recommendation

- Adopt proposed heavy-duty diesel engine software upgrade regulation
- Direct Executive Officer to withhold filing regulation until Board reviews Voluntary Program in December 2004